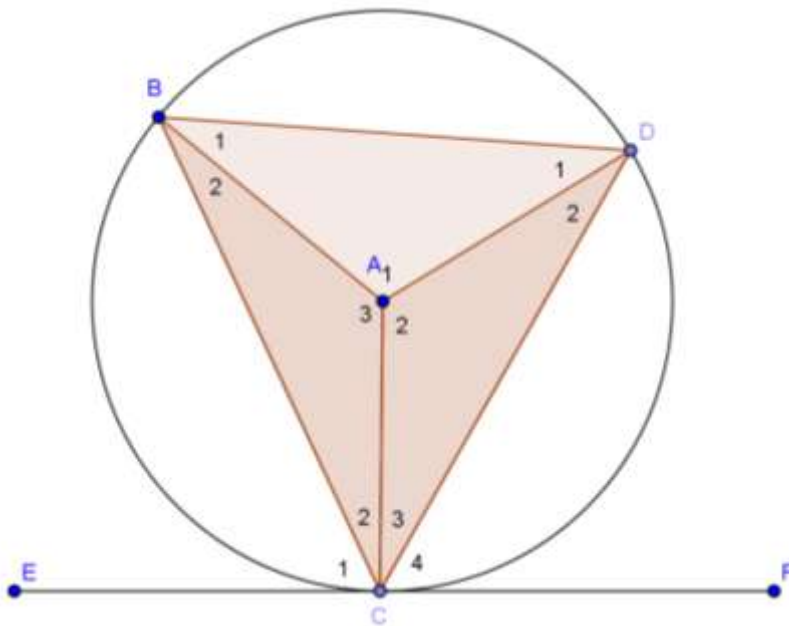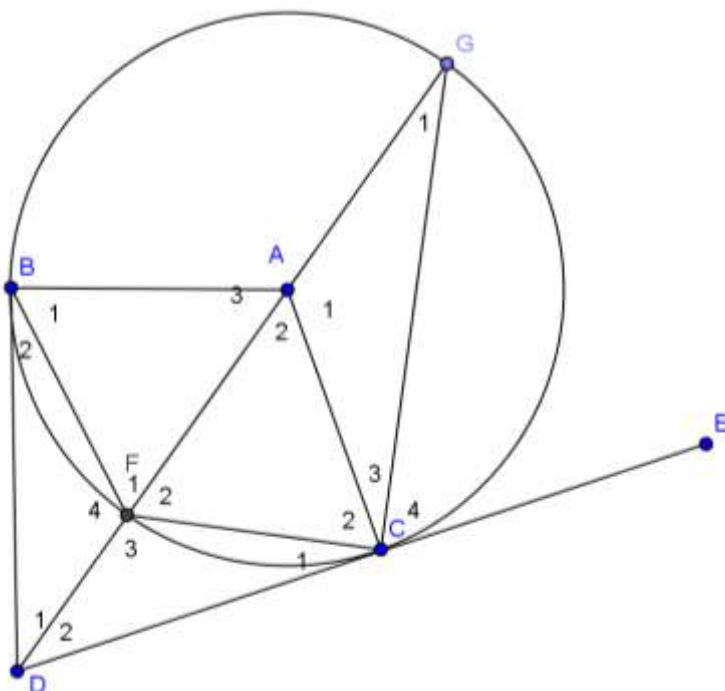![SHARP]

Worksheet 7: Euclidean Geometry
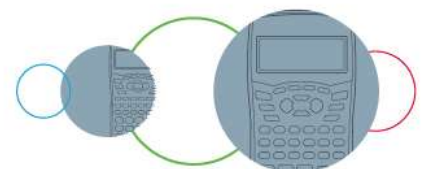
Grade 11 Mathematics

1.   A is the centre with points B, C and D lying on the circumference of the circle. Line EF is a tangent to the circle at C. Given that $\hat{C}_2 = \hat{C}_3$.

a)   Prove that $E\hat{C}B = D\hat{C}F$. (C)

b)   Name three sets of angles that are equal.   (R)

c)   Prove that ∆ABC is congruent to ∆ADC.   (R)

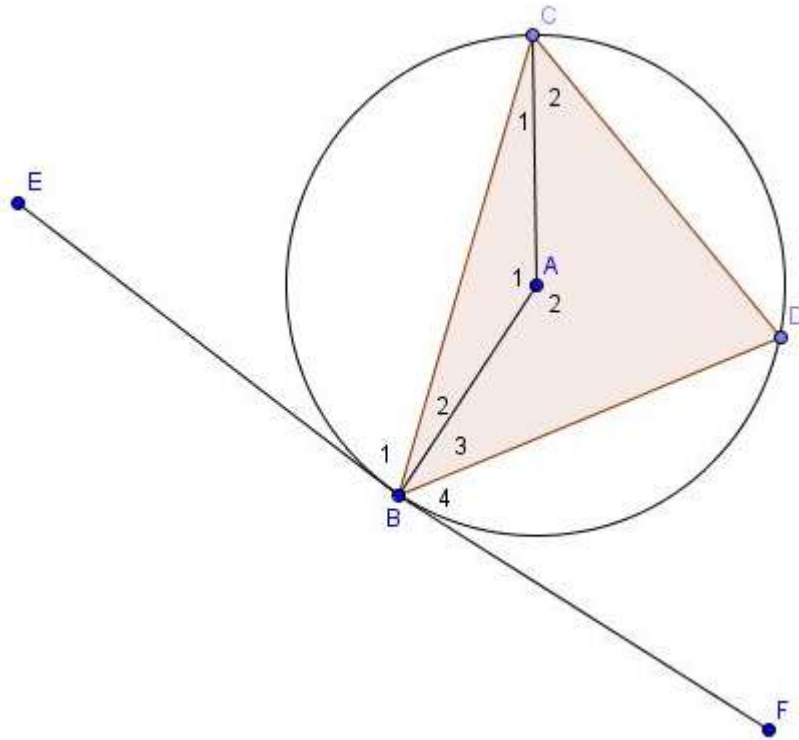d)   Show that $\hat{A}_2 = \hat{A}_3$ (C)

2.   Given the circle below with A as the centre. B, C, F and G lie on the circumference. BD is a tangent to the circle at B and DCE is a tangent to the circle at C.

a)   Show that $\hat{C}_1 = \hat{C}_3$ (R)

b)   Prove that ∆ABD is congruent with ∆ADC.   (C)

c)   Prove that ∆ABF is congruent with ∆AFC and that $\hat{B}_1 = \hat{F}_2$ (C)

d)   Show that $\hat{A}_2$ is twice the value of $\hat{C}_3$ (C)

e)   Give the value of $\hat{C}_{1+2}$ (R)
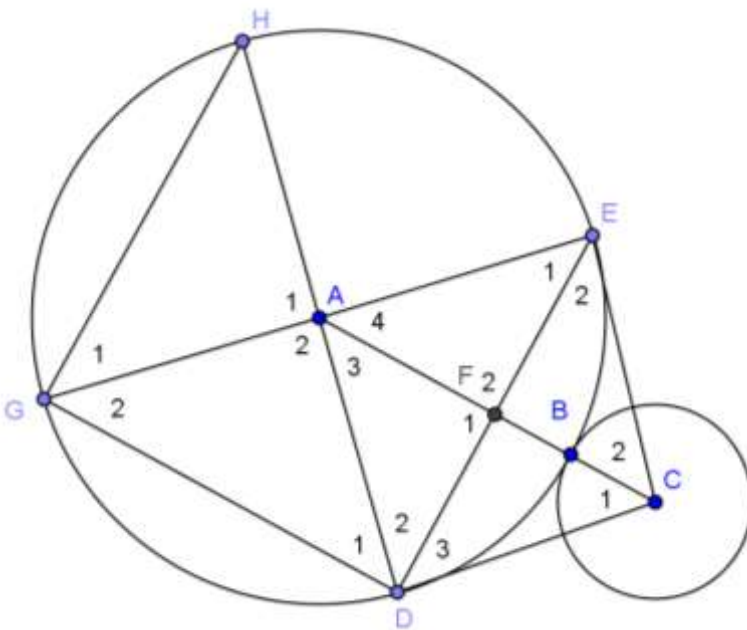
SEARTEC   Proud distributor of: **SHARP**

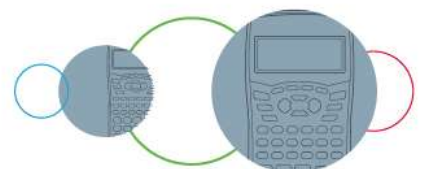3. Given below is the circle with Centre at A with B, C and D on the circumference of the circle.

Given that $\hat{D} = x$ and that EF is a tangent to the circle at B.

a) Determine $\hat{A}_1$ and $C\hat{B}E$ in terms of x. (R)

b) Determine the value of $\hat{C}_1$ in terms of x. (C)

c) Prove that $\hat{B}_{1+2}$ is a 90° angle. (C)

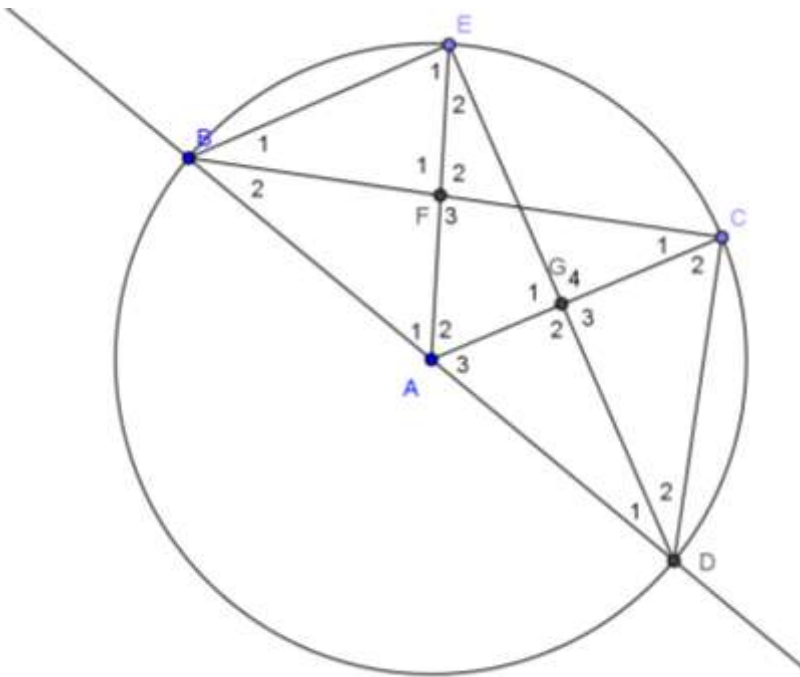d) Prove that AE is the diameter of a circle around ∆ABE. (P)

4. Given the circle below with A as the centre. Points B, D, E, G and H lie on the circumference of the circle. EC is a tangent to the circle at E and DC is a tangent to the circle at D. C is the centre of the second circle.

a) Prove that $\hat{G}_1 = \widehat{E_1}$. (C)

b) Prove that AECD is a square. (P)

c) Prove that GH is parallel to ED. (C)

d) If EH were joined, prove that DEHG is a square. (P)
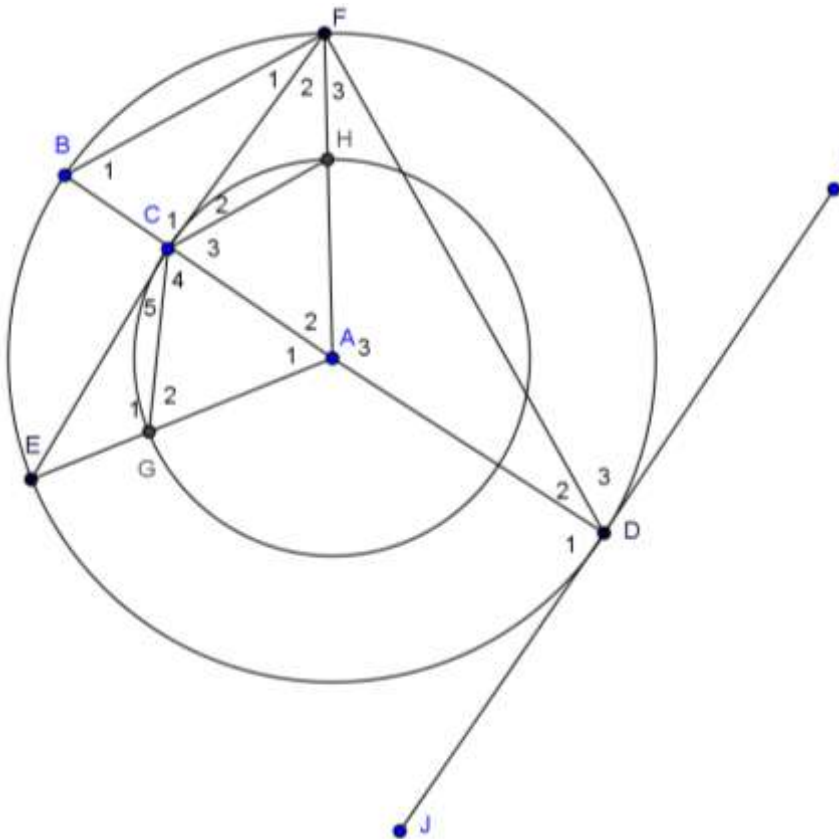
e) Prove that ∆CEF and ∆CDF are congruent. (C)

5. Given the circle with Centre A and Diameter BAD. Given that BF = FC and EG = GD.

a) Prove that $\hat{E}_{1+2} = \hat{C}_{(1+2)}$ (R)

b) Prove that ECGF is a cyclic quad. (P)

c) Prove that BE is parallel to AC. (P)

d) Prove that $\hat{B}_1 = \hat{B}_2$. (C)

e) Prove that $\hat{B}_2$ is 30° (P)

f) Prove that $\hat{A}_2 = 60°$. (P)

6. Given two circles both with centre A. B, D, E and F lie on the circumference of the outer circle while C, G, and H lie on the circumference of the inner circle. IJ is a tangent to the outer circle at D, while EF is a tangent to the inner circle at C. BD is the diameter of the larger circle.

a) Find four angles that are 90°. (R)

b) Prove that $\hat{A}_2 = 2\hat{D}_2$ (C)

c) Prove that ΔAFC is congruent with ΔACE. (C)

d) Hence, or otherwise, prove that ΔAHC is congruent with ΔACG. (C)

e) Prove that $\hat{D}_3 = \hat{F}_{1+2}$ (C)

f) Prove that CH is parallel to BF. (P)